Amendments to the Drawing:

The attached replacement drawing sheet includes a change to Figure 1. This drawing sheet replaces the original sheet. In Figure 1, the reference numeral 14 has been added. That is, the reference numeral 14 has been added to identify the illustrated surface of the substrate.

Attachment: Replacement Sheet

REMARKS

Claims 1-20 are pending. By the present Amendment, claim 9 is amended and new claims 21-23 are added. Upon entry of this Amendment, 23 claims will be pending (claims 1-23), of which five (claims 1, 10, 11, 21, and 22) are independent. Enclosed is a check in the amount of $550 to cover the fee for adding three total claims in excess of twenty and for adding two independent claims in excess of three. If the Office determines that any additional fees are deemed to be necessary with the filing of this Amendment, then the Office is authorized and requested to charge such fees to Deposit Account No. 061910. No new matter will be incorporated into the present application by entry of this Amendment.

In the Office Action mailed July 12, 2005, the Examiner objected to the drawings as failing to comply with 37 CFR 1.84(p)(5); objected to the specification because of certain informalities (paragraphs 2 and 3 of the Office Action); objected to claim 9 because of certain informalities (paragraph 4 of the Office Action); rejected claims 1-7, 9-17 and 19-20 under 35 U.S.C. 103(a) as being unpatentable over USPN 6,090,481 to Depauw; and rejected claims 8 and 18 under 35 U.S.C. 103(a) as being unpatentable over Depauw in view of USPN 5,837,361 to Glaser et al. Applicant respectfully disagrees with the rejections, and with the characterizations of the art and Applicant's invention. Therefore, Applicant respectfully requests reconsideration.

In response to the Examiner's objection to the drawings, Applicant provides the enclosed Replacement Sheet for Figure 1, in which the reference numeral 14 has been added. This reference numeral 14 refers to the illustrated surface of the substrate and was not shown in the original Figure 1. Applicant thanks Examiner Piziali for his attention to this item.

In response to the Examiner's objections to the specification due to certain informalities (paragraphs 3 and 4 of the Office Action), Applicant hereby makes amendments to correct the noted informalities. On page 1, line 6, Applicant hereby changes "Serial No. 09/728,435" to "Serial No. 09/728,435, now abandoned". On page 1, line 11, Applicant hereby changes "with•temperable" to "with temperable". On page

3, line 6, Applicant hereby replaces the term "unsalable" with "impossible to sell". Applicant thanks Examiner Piziali for his careful attention to these items.

In response to the Examiner's objections to claim 9 due to certain informalities, Applicant hereby amends claim 9 to replace "second intermediate dielectric layers" with "second intermediate dielectric layer" and to replace "third intermediate dielectric layers" with "third intermediate dielectric layer". Applicant thanks Examiner Piziali for his attention to these corrections.

In response to the Examiner's rejection of claims 1-7, 9-17 and 19-20 under 35 U.S.C. 103(a) as being unpatentable over Depauw, and the rejection of claims 8 and 18 under 35 U.S.C. 103(a) as being unpatentable over Depauw in view of Glaser et al., Applicant respectfully traverses these rejections and requests reconsideration.

Independent claims 1, 10, and 11 require five intermediate dielectric layers, where first, third, and fifth such layers comprise a first dielectric material, and second and fourth intermediate dielectric layers comprise a second dielectric material. These independent claims recite "...each of the first, third, and fifth intermediate dielectric layers has an optical thickness greater than the optical thickness of any of the second and fourth intermediate dielectric layers...".

Applicant considers that Depauw lacks any motivation for the claimed thickness arrangement. Depauw is concerned with achieving good optical properties in the particular situation of laminated glass (e.g., two glass sheets with a plastic interlayer sandwiched between the glass). As a result, Depauw's teachings are focused on the physical thicknesses of the two metal layers in their coating, and on the overall and relative optical thicknesses of the three transparent dielectric "layers" in their coating. These parameters tend to control the optical properties with which Depauw is concerned. Therefore, it is not surprising that Depauw is silent with respect to any design advantages that can be achieved using particular thickness arrangements for "sub-layers".

Depauw does not teach any advantage that can be achieved, or any problem that can be solved, by selecting particular relative thicknesses for the intermediate dielectric "sub-layers" of their coating, much less do they teach the thickness arrangement claimed by the Applicant. Therefore, Depauw clearly does not contain any motivation to modify

or combine its teachings in such a way as to somehow end up with the thickness arrangement claimed by the Applicant.

Moreover, the claimed thickness arrangement achieves results that would be entirely unexpected in view of a thorough reading of Depauw. For example, by providing alternating intermediate layers of two different dielectric materials where the layers of one material are all thinner than the layers of the other material, the coating manufacturer is allowed to build into the coating a mechanism that addresses problems associated with haze caused by crystal growth and defect (e.g., pinhole) propagation while at the same time being able to avoid problems that can be experienced when using alternating layers of two dissimilar materials. Such alternating layers, for example, can be formed of a first dielectric material that is an oxide or suboxide and a second dielectric material that is a nitride. One advantage of utilizing a nitride as one of the dielectrics and an oxide as the other dielectric is the likelihood that these two materials would have a significantly different crystalline structure. This can be done, for example, to increase the likelihood that crystal growth and defect propagation will be limited to the confines of a single layer. For example, adjacent nitride and oxide layers can be provided to reduce the likelihood that crystals and pinholes will extend from one layer into an adjacent layer. It is surmised that the morphologies of nitrides and oxides tend to be different enough that crystal growth in an oxide layer will not tie into crystal growth in an adjacent nitride layer and shadowed growth will not occur to the extent that pinholes in an oxide film continue to propagate into an overlying nitride film (or vice versa). In embodiments involving alternating oxide and nitride layers, the nitride layers may be, silicon nitride or another nitride that is stressy, absorptive, etc. By limiting the thickness of such nitride films, the coating can have the advantages of limiting the stress, absorption, etc. that would occur if thick layers of the nitride were used. For example, if the nitride is silicon nitride, then it is desirable to use relatively thin silicon nitride films in conjunction with thicker oxide or suboxide films. Silicon nitride is a particularly stressy material. By alternating thin silicon nitride films with thicker oxide films, unacceptable levels of stress can be avoided while at the same time receiving the benefits associated with breaking-up the intermediate dielectric stack.

Still further, Applicant submits that Depauw teaches away from the claimed thickness arrangement. In Table A of Depauw, there are shown ten examples of film stacks where all three of the "non-absorbent layers" (referred to respectively as "Ox-1", "Ox-2", and "Ox-3") are made entirely of oxide films. With respect to the "Ox-2" examples, Depauw teaches that the central zinc oxide sub-layer should be about twice the thickness of each of the "extreme sub-layers of ZnO" and about twice the thickness of each of the two tin oxide sub-layers (Depauw, column 7, lines 48-53). While no reason is given for this teaching, this clearly teaches away from the claimed thickness arrangement.

In view of the foregoing remarks, Applicant submits that the claimed thickness arrangement is both novel and non-obvious over Depauw. The cited Glaser et al. reference provides no additional teaching that would motivate skilled artisans to modify or combine the teachings of Depauw in such a way as to somehow end up with the claimed thickness arrangement. Therefore, Applicant respectfully requests reconsideration of each rejection in the Office Action.

Applicant also considers that the claims specifying the first dielectric to be an oxide or suboxide and the second dielectric to be a nitride are patentable in their own right. Without some considerable motivation to alternate oxide and nitride layers within the same intermediate dielectric stack, skilled artisans would wish strongly to avoid the complications associated with departing from the preferred all-oxide intermediate stack arrangement taught by Depauw. There are formidable challenges to be faced when both oxide and nitride layers are deposited in the same intermediate stack. Consider that Depauw deposits their coating using an in-line deposition apparatus having two chambers (Depauw, column 6, lines 57-59). One of these chambers is used to deposit the oxide films, while the other chamber is used to deposit the metal films (Depauw, column 6, line 65 through column 7, line 5). Each substrate is moved back and forth in several passes through the coater to deposit the desired succession of layers (Depauw, column 7, lines 5-7). With a coater of this nature, using different reactive gases to deposit different layers within the same intermediate stack would make the process completely impractical. For example, once an oxide sub-layer is deposited in the chamber adapted for depositing the "non-absorbent" layers, the chamber would need to be pumped down (e.g., evacuated of the oxidizing gas) and re-filled with nitriding gas. Then, once the chamber is ready for

use with the nitriding atmosphere, a nitride sub-layer could be deposited over the previously deposited oxide sub-layer. Then, the chamber would need to be pumped down again, and re-filled with oxidizing gas, after which the next oxide sub-layer could be deposited. This pump-down routine would need to be repeated each time an oxide layer is deposited over a nitride layer and each time a nitride layer is deposited over an oxide layer. As a result, there would need to be a truly great motivation to alternate nitride and oxide layers within the same intermediate stack. Even if Depauw would have been using a large in-line coater having adjacent chambers equipped with dynamic gas separation systems (pumps, narrow substrate transfer tunnels between adjacent chambers, etc.), skilled artisans would need a substantial impetus to consider taking on the challenges associated with alternating oxide and nitride layers within the same intermediate stack. For example, undesired gas flow between adjacent oxide and nitride chambers can create problems. When a chamber is set to operate at process parameters appropriate for achieving a desired film thickness, the process parameters are set for the deposition rate of a particular target material and a particular sputtering gas. If the process is set for a stable oxidizing process, for example, and nitride gas from an adjacent chamber flows into the oxide chamber, the deposition rate can be thrown off, the process can become unstable, and/or the resulting coatings can have non-uniform thicknesses and therefore can fall out of specification. These process challenges would be well understood by skilled artisans considering the idea of adopting a deposition process that requires different reactive gases to be used to deposit different layers within the same intermediate stack. Moreover, in the embodiments addressed in this paragraph, the intermediate stack comprises at least three oxide layers and at least three nitride layers. Skilled artisans would understand the above-noted process challenges to be particularly acute in cases where this extensive arrangement of intermediate layers is deposited reactively using separate oxidizing and nitriding deposition zones. Therefore, without having a substantial reason for providing alternating nitride and oxide films in the same intermediate stack, skilled artisans would feel a strong motivation <u>not</u> to adopt such an arrangement. The Depauw reference teaches no benefits to be achieved, or problems to be solved, by alternating oxide and nitride layers within the same intermediate stack. As

a result, the claimed combination should not be considered obvious over the teachings of Depauw.

New claims 21-23 cover certain embodiments wherein oxide and nitride layers are alternated within the same intermediate dielectric stack. These new claims are believed to be patentable for the reasons concluded in the immediately preceding paragraph. Claims 22-23 recite the particular arrangement of choosing the first dielectric to be a combination of zinc oxide and tin oxide, and choosing the second dielectric to be a silicon nitride. These embodiments provide particularly good durability, among other advantages, and therefore are believed to be patentable in their own right.

In view of the foregoing, it is submitted that the claims of this application are in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested. The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,

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